jm

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/809,340	03/26/2004	Takesi Yamakawa	0757-0286PUS1	8223

2292 7590 06/07/2007

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER	
NGUYEN, CUONG H	
ART UNIT	**PAPER NUMBER**
3661	
NOTIFICATION DATE	**DELIVERY MODE**
06/07/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/809,340	YAMAKAWA ET AL.	
	Examiner	Art Unit	
	CUONG H. NGUYEN	3661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 9-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 9-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is the answer to a response received on 3/14/2007.

2. Claims 1-7, and 9-11 are pending in this application.

Response

3. The examiner withdraws previous rejections (mailed on 1/19/2007). What the examiner sees in the pending claims are merely feedback control theories applying into controlling a steering device (i.e., a different intent of use can be made an obvious limitation, see Figs. 2.2, and 4) – this feedback control (as claimed) is not necessarily applied to steering of a ship (see the disclosure of applicant, Paragraph [0036] The steering amount calculator 22, to which the output of the adder 18 and an output of the control parameter calculator 20 are supplied, is conventionally known control means which performs proportional-plus-integral-plus-derivative (PID) control action. The steering amount calculator 22 calculates an amount of steering .delta.PID from the deviation (.theta.-.theta..sub.0) normalized to the range of 0.degree..+-.180.degree. based on control parameters including a proportional coefficient (proportional control coefficient) KP, an integral coefficient (integral control coefficient) KI and a differential coefficient (differential control coefficient) KD. The steering amount calculator 22 may be configured by hardware alone or by a computer and a software program executed by the computer. Specifically, the steering amount calculator 22 of this embodiment includes an integrator 30, a differentiator 36, coefficient amplifiers 32, 34, 38 and an adder 40 as shown in FIG. 2. In the steering amount calculator 22 thus configured, the integrator 30 integrates the deviation (.theta.-.theta..sub.0) output from the adder 18 and the coefficient amplifier 32 multiplies the result of integration by the integral coefficient KI. At the same

time, the coefficient amplifier 34 multiplies the deviation (.theta.-.theta..sub.0) by the proportional coefficient KP. Also, the differentiator 36 differentiates the deviation (.theta.-.theta..sub.0) and the coefficient amplifier 38 multiplies the result of differentiation by the differential coefficient KD. The results of these calculations are input into the adder 40, which outputs the sum of the input calculation results as the steering amount .delta.PID. The integral coefficient KI, the proportional coefficient KP and the differential coefficient KD are supplied to the coefficient amplifier 32, the coefficient amplifier 34 and the differentiator 36, respectively, and the coefficient amplifier 32, the coefficient amplifier 34 and the differentiator 36 store values of the respective coefficients KI, KP, KD.

And paragraph [0039]: "The control parameter calculator 20 determines the control parameters (proportional coefficient KP, integral coefficient KI and differential coefficient KD) used by the steering amount calculator 22 for calculating the steering amount .delta.PID . The deviation (.theta.-.theta..sub.0) of the ship's current heading .theta. from the intended course .theta. is fed into the control parameter calculator 20. The control parameter calculator 20 determines the control parameters based on this input data. Again, the steering amount calculator 22 may be configured by hardware alone or by a computer and a software program executed by the computer".

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Dependent claims 4-6 lacks an antecedent basis for: "...of the latest behaviors"; it is also unclear with regarding "the latest behaviors" because the applicant fails to particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention – there is no definition about a so-called "behavior" – it is vague and a very broad limitation (i.e., what is a behavior that the applicant wants to claim – why not point it out).

As to claim 4, it is unclear for "...larger than the specific threshold.value." as claimed.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. **Claims 1, and 9 are rejected under 35 U.S.C. § 102(b) as being anticipate by Wesner (US Pat. 3,604,907).**

A. As to independent claims 1, and 9: As best interpretation, these claims are directed to a system and a method for controlling speed of a moving object/ship, Wesner teaches a control system for regulating a quantity (see Wesner, "a yawing motion") to be controlled based on a deviation of the controlled quantity from a target value thereof and control parameters (see Wesner, "filter the oscillatory yaw frequencies from the heading error signal"), said control system comprising: a behavior feature value detector for detecting one of the period and the frequency of behaviors of a specific kind performed

by a subject to be controlled (see Wesner, "oscillatory yaw frequencies from the heading error signal" – note that detecting a deviation is detecting a heading error signal here wherein detecting task is an inherent task).

Wesner teaches in Brief Summary Text (7): The yawing motion, for most ships, occurs at frequencies at which the corresponding rudder motion is ineffective in steering the vessel. Hence, the excessive rudder motion experienced under the conditions described serves primarily to shorten the life of the components of the rudder servomechanism because of excessive wear and to increase the drag on the ship, hence adversely affecting fuel consumption thus increasing the operating costs of the craft.

Wesner teaches in Brief Summary Text (9): Another possible prior art solution to the problem discussed above is to filter the oscillatory yaw frequencies from the heading error signal thus minimizing the excessive motion of the rudder. Low pass filters would ordinarily be utilized for this purpose. Application of such filters with sufficiently low cutoff frequencies to be effective, introduces excessive lag into the ship's steering servo system precipitating unstable servo operation and impairing the course-keeping accuracy thereof.

Wesner teaches in Detailed Description Text (2): Referring to FIG. 1, a source 10 provides the heading error signal, .psi..sub.e, to the steering command computer of the present invention. The heading error signal source 10 may comprise the directional reference system of the ship which might include a suitable gyrocompass system. The heading error signal is applied as an input to an operation amplifier 11. The output of the amplifier 11 is fed back to its input via a resistor 12 and a capacitor 13. The resistor 12 and the capacitor 13 provide a low-pass filtering function for the signal .psi..sub.e. The

heading error signal is processed by the filter to remove high frequency yaw signals that might result in excessive and wasteful motion of the rudder. It will be appreciated, however, that the pass band of the filter is chosen sufficiently wide so that only negligible lag is introduced into the system, hence maintaining servo stability. It may thus be appreciated that yaw signals occurring at low frequencies that may produce excessive and wasteful rudder motion will lie within the pass band of the filter and hence be transmitted there through. The amplifier and filter are of conventional design and equivalents thereof may be utilized to the same effect.

Wesner teaches in Detailed Description Text (18):

The signal provided by the switch 52 is applied via the differentiating capacitor 44 to an adjustable low-pass filter 53. The pass band of the filter 53 may be adjusted in accordance with the frequencies of the yaw signals that the system might encounter dependent on the ship in which the computer is installed);

Wesner teaches a variation calculator for calculating the amount of variations in said one of the period and the frequency; and a control parameter updator for updating the value of a control parameters based on the amount of said variations (see Wesner, Figs. 1a-1c – note that updating is inherent in the system of Wesner as using new/updated values)

Wesner teaches in Detailed Description Text (6):Applying a positive voltage signal to the input to the circuit 21 having a magnitude greater than that of the reference voltage at the wiper arm 111 will reverse-bias the diode 116 thus inhibiting current flow therein and in the resistor 115. The terminal 103 will assume the voltage level of the

reference voltage at the wiper arm 111 and the terminal 102 will assume a positive voltage level slightly less than the signal present at the input to the circuit 21 due to the voltage decrease across the diode 117. The terminal 102 will now be at a more positive potential than the terminal 103 and the terminal 106 will change its state to a negative value.

Wesner teaches in Detailed Description Text (7): The feedback resistors 113 and 121 form a voltage divider that applies a percentage of the negative voltage output on the terminal 106 to the potentiometer 23 which reduces the reference voltage at the wiper 111 and hence at the terminal 103. Therefore, the positive signal applied to the input to the circuit 21 will have to decrease to a level below that which triggered the change of state of the threshold circuit 21 in order to effect a return to its initial state. The magnitude of this hysteresis is determined by the resistance values of the resistors 113 and 121.

Wesner teaches in Detailed Description Text (8):

With the threshold circuit 21 in its initial state, a negative voltage signal applied to its input having an absolute value greater than that of the reference voltage of the wiper 111 will reverse-bias the diode 117 thus inhibiting current flow therein and in the resistor 118. The terminal 102 will assume ground potential and the terminal 103 will assume a negative voltage level determined by the diode 116 and the resistors 114 and 115. The terminal 102 will be more positive than the terminal 103 and the terminal 106 will change its state to a negative value.

Wesner teaches in Detailed Description Text (9):

The feedback resistors 113 and 121 apply a percentage of the negative voltage output on the terminal 106 to the potentiometer 23 which reduces the reference voltage at the wiper

111 and the terminal 103 becomes more negative. Therefore, a negative signal applied to the input to the circuit 21 will have to be less negative than that which triggered the change of state thereof. An economical threshold circuit 21 is thus provided comprising a single operational amplifier 22 which changes its output state whenever an applied bipolar input signal exceeds a reference voltage. Further, the reference voltage level for the bipolar input is controlled by a single adjustment.

Wesner teaches in Detailed Description Text (14):

The integrator 24 may be reset to a reference condition by a signal on a reset line 37. The integrator 24 is usually reset when a change in course is commanded.

Wesner teaches in Detailed Description Text (39):

While the invention has been described in its preferred embodiment, it is to be understood that the words which have been used are words of description rather than limitation and that changes may be made within the purview of the appended claims without departing from the true scope and spirit of the invention in its broader aspects.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 2-7, and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wesner (US Pat. 3,604,907), in view of Kawada et al. (US Pat. 3,656,043).

The rationales and references for a rejection of claim 1 are incorporated.

The applicant claims an updator changes the value of a proportional control coefficient which constitutes one of the control parameters according to a change/amplitude of the controlled quantity when the amount of said variations is smaller than a specific threshold value. (see Kawada et al., Detailed Description Text (2): With reference to FIG. 1 a description will be given first of the turning characteristics of a huge vessel so as to facilitate a better understanding of the principles of this invention. Generally, the relation between rudder angle .delta. and the turning angular velocity .theta. of the giant vessel obtained by spiral or reverse spiral tests, has a characteristic as indicated by the curve a in FIG. 1. The turning angular velocity .theta. is representative of a value when the ship is turning under steady-state conditions (while the ship is turning with a constant radius under steady-state conditions). When the course of a giant vessel, is changed automatically and the angle of the course change is large the vessel will turn at substantially the steady-state rate before reaching the newly-set course, and the turning angular velocity .theta. is indicated by curve a in FIG. 1. When a course change of less than several degrees or when a set course is maintained with an automatic steering system, the ship does not turn at steady-state rate and the turning velocity of the ship is surprisingly low. It is thought that the ship is subject to a transient phenomenon in the latter case. Thus, the turning characteristics of the ship are different in the former and latter cases. Accordingly, when the course is changed by a large angle by the automatic steering system in a system in which the rate time is set for suitable automatic maintenance of the set

course, the ship will over-shoot the newly-set course by a large amount. Especially is this true as to a ship which has such hysteresis between .theta. and .delta. as indicated by the curve b in FIG. 1. If the rate time is selected to be suitable for large course change, the rate time will be too long for the maintenance of the set course and the steering device will be too sensitive and will over-respond to external disturbances such as waves, winds and gimballing errors produced by a compass device. These factors will cause an unnecessary increase in the number of steering operations and hence result in abuse of the steering device.

Kawada et al., also teach in Detailed Description Text (31): Further, the means for providing the reference voltage Vc is not limited specifically to Zener diodes but may be in the form of any kind of a dead-zone element or circuit. FIG. 9 illustrates one example, in which no Zener diodes are used but instead conventional diodes D are connected in opposition to each other and their connection point q is connected to one electrode of the capacitor Ca and a variable resistor Rx is inserted between the other ends of the diodes D. A series circuit consisting of resistors Rc.sub.1 and Rc 2 is connected to both ends of the variable resistor Rx and the connection point of the both resistors Rc.sub.1 and Rc.sub.2 is grounded. A voltage is applied from a DC power source E through suitable resistors Rc.sub.3 and Rc.sub.4 to both ends of the variable resistor Rx of the circuit connected as above described, thereby to suitably adjust the value of the variable resistor Rx, by which a reference voltage corresponding to the Zener voltage can be obtained as desired. «)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to implement Wesner's patent with Kawada suggestion to vary that control value a higher or a lower coefficient/factor as taught by control theories

class in colleges because a change of coefficient/factor makes a change to an input parameter.

A. As per claim 5: The rationales and references for a rejection of claim 1 are incorporated.

The examiner submits that calculating a variation based on a (standard) deviation of periods/frequencies of a control parameter. Wesner teaches a variation calculator for calculating the amount of variations in said one of the period and the frequency; and a control parameter updator for updating the value of a control parameters based on the amount of said variations (see Wesner, Figs. 1a-1c – note that updating is inherent in the system of Wesner as using new/updated values)

B. As per claims 6-7: The rationales and references for a rejection of claim 1 are incorporated.

Wesner does not disclose that "a control system further comprising: a duration detector to determining a time range of yaw heading.

However, using a timer for measuring a duration (a starting time, and an ending time) in controls is necessary in many applications because it clearly shows a range of time/a duration for a change (i.e., a heading variation).

C. As per claims 10-11: The rationales and references for a rejection of claim 1 are incorporated.

Besides similar limitations as in claim 1 that Wesner's teaching, Kawada et al. suggest a control device for regulating a quantity to be controlled based on a deviation from a target value, said control device comprising: a detector for detecting one of the period and the frequency of a subject to be controlled; a calculator for calculating variations in said one of the period/frequency; and a control state judgment section for determining a control state of the controlled subject (based on an amount of said

variations).

Kawada et al., also teach in Detailed Description Text (2): With reference to FIG. 1 a description will be given first of the turning characteristics of a huge vessel so as to facilitate a better understanding of the principles of this invention. Generally, the relation between rudder angle .delta. and the turning angular velocity .theta. of the giant vessel obtained by spiral or reverse spiral tests, has a characteristic as indicated by the curve a in FIG. 1. The turning angular velocity .theta. is representative of a value when the ship is turning under steady-state conditions (while the ship is turning with a constant radius under steady-state conditions). When the course of a giant vessel, is changed automatically and the angle of the course change is large the vessel will turn at substantially the steady-state rate before reaching the newly-set course, and the turning angular velocity .theta. is indicated by curve a in FIG. 1. When a course change of less than several degrees or when a set course is maintained with an automatic steering system, the ship does not turn at steady-state rate and the turning velocity of the ship is surprisingly low. It is thought that the ship is subject to a transient phenomenon in the latter case. Thus, the turning characteristics of the ship are different in the former and latter cases. Accordingly, when the course is changed by a large angle by the automatic steering system in a system in which the rate time is set for suitable automatic maintenance of the set course, the ship will over-shoot the newly-set course by a large amount. Especially is this true as to a ship which has such hysteresis between .theta. and .delta. as indicated by the curve b in FIG. 1. If the rate time is selected to be suitable for large course change, the rate time will be too long for the maintenance of the set course and the steering device will be too sensitive and will over-respond to external

disturbances such as waves, winds and gimballing errors produced by a compass device. These factors will cause an unnecessary increase in the number of steering operations and hence result in abuse of the steering device.".

Conclusion

7. Claims 1-7, and 9-11 are not patentable.

8 Any inquiry concerning this communication or earlier communications from the examiner should be directed to CUONG H. NGUYEN whose telephone number is 571-272-6759 (email address: cuong.nguyen@uspto.gov). The examiner can normally be reached on 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, THOMAS G. BLACK can be reached on 571-272-6956. The Rightfax number for the organization where this application is assigned is 571-273-6759.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Please provide support, with page and line numbers, for any amended or new claim in an effort to help advance prosecution; otherwise any new claim language that is introduced in an amended or new claim may be considered as new matter, especially if the Application is a Jumbo Application.

CUONG NGUYEN
PRIMARY EXAMINER
Cuonghnguyen